



**Facts about
Trondheim Energiverk AS (TEV)**

(Trondheim Energy Company)

2001



A brief History

The idea which led to the founding of TEV was conceived as early as 1890. However, the first power plant, Øvre Leirfoss, was not put into operation until the autumn of 1901, providing electricity to the first subscribers and to the tramway system. This marks the beginning of "Trondhjems Electricitetsværk og Sporvei".

For the last 100 years or more, the challenge has been to construct power plants, transmission lines, transformer stations and distribution networks to keep up with the increasing demand for electricity.

During the first forty years, hydro electric power development took place in the river Nidelva. When the hydro power plants could no longer meet the demand, a thermal power plant was

built as well. Since then developments have taken place along the entire Nea-Nidelva watercourse. Between 1970 and 1985, TEV took part in the planning and development of the Orkla watercourse. Today, 80 % of the hydro power production comes from our own power plants in the Nea-Nidelva watercourse, and the rest from the power plants in the river Orkla, of which TEV owns a major part.

In 1952 the Stockholm Electricity Company and TEV signed a contract whereby the development of the Nea power plant would be financed by Swedish capital, which would be reimbursed by the delivery of electric power to Stockholm. Hence, the first electricity link between Norway and Sweden was established in 1960.

Øvre
Leirfoss
power plant



Juni 1901

Trondheim Energy Company

Trondheim Energy Company has supplied power for light and heating to its customers since 1901. The Company has grown to keep pace with the increasing demand, which, although moderate during the first 60 years, increased by 6 % a year during the next 25 years and by on average 1,3 % a year for the last 10 years. Today, consumption is three times higher than it was in 1965.

Our main task is to supply the inhabitants of Trondheim and Klæbu with electricity.

Our own 14 power plants in Nea/Nidelva and 5 partly-owned power plants in Orkla produce the electricity and an extensive transmission - and distribution network ensures that it reaches its destination.

Another important task is district heating based on refuse incineration, which constitutes 10 % of our total energy production.

In Central Norway, Trondheim Energy Company is the largest energy producer as well as energy

distributor. In Norway as a whole, TEV is the seventh and sixth largest respectively.

It is the hope and ambition of the owner, Trondheim Municipality, that TEV will be a leading participant on the energy market, and we are currently working on various strategies to reach this goal.

The organization

The highest authority in the company is the board and the general assembly.

The board consists of 7 members and 2 observers; 5 members are elected by the general assembly, and 2 members and the observers by and from among the employees.

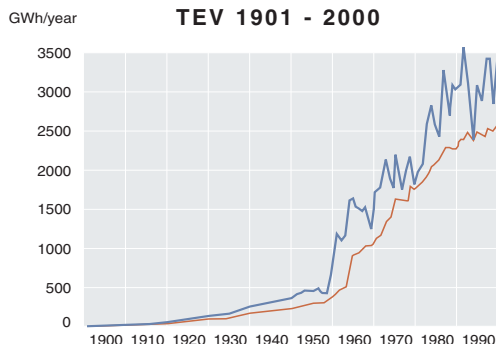
Since 1 January 1999 the company has been organized as a group of companies.

The subsidiaries are :

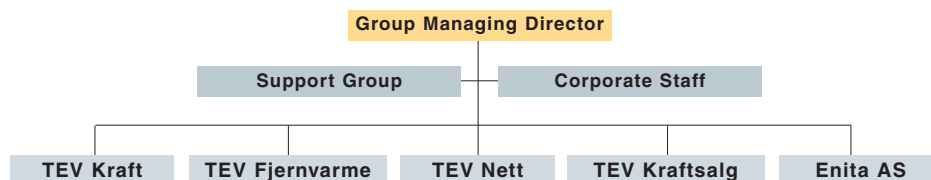
- Trondheim Energiverk Kraft AS (TEV Kraft)
- Trondheim Energiverk Fjernvarme AS (TEV Fjernvarme)
- Trondheim Energiverk Nett AS (TEV Nett)
- Trondheim Energiverk Kraftsalg AS (TEV Kraftsalg)
- Enita AS.

The parent company Trondheim Energiverk AS (TEV) is organized with a corporate staff and a support group.

**Production and Consumption:
TEV 1901 - 2000**



- Power production
- Consumption in the concession area



The TEV organization

| | |
|---|---------|
| Power production, GWh/year | 3 160 |
| Consumption in the concession area, GWh/year | 2 500 |
| District heating, GWh/year | 340 |
| Annual turnover in mill NOK | 1 100 |
| Number of inhabitants in the concession area of Trondheim and Klæbu | 155 000 |
| Number of grid customers | 85 000 |
| Number of employees | 455 |

Key figures

Production and wholesale trade of power

The Nea-Nidelv watercourse has its source near Sylan in Sweden and flows out to sea in Trondheim. The distance from the source to the sea is 160 km and the catchment area of the watercourse is 3100 km².

Today, Trondheim Energy Company is the owner of 14 power plants in the Nea-Nidelva watercourse. Here the total average annual output is 2550 GWh (Mill. kWh). A part of this, 1540 GWh/year, comes from the power plants in Tydal/Selbu and the rest, 1010 GWh/year, comes from the power plants downstream from the lake Selbusjøen.

The Orkla watercourse has its source in Store Orkelsjø, east of Oppdal, and flows out to sea at Orkanger. The length of the watercourse is 170 km and the catchment area is 3092 km².

TEV has participated in the implementation of 5 power plants in the Orkla watercourse and now owns 48.6 % of the Orkla Power Plants (KVO). Here the total average annual output is 1250 GWh, of which TEV's share is 608 GWh/year.

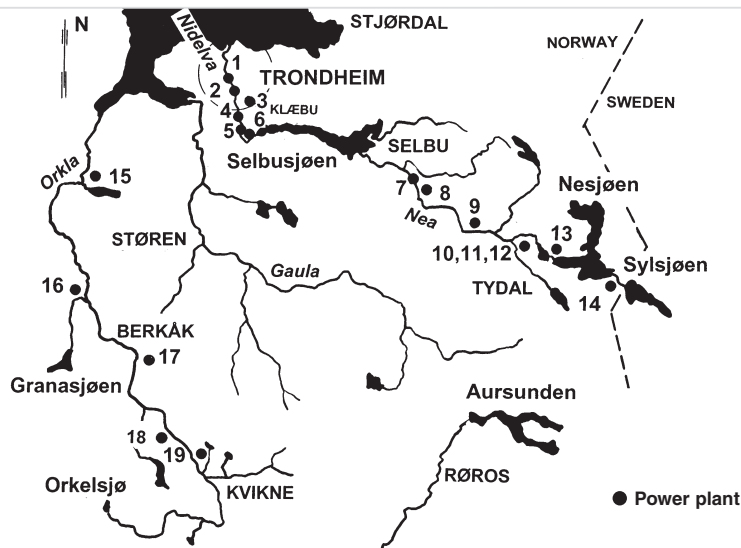
Our production plants in Nea-Nidelva and Orkla watercourses combined provide 3% of the hydro-power production in Norway. TEV Kraft trades the bulk of the power production through the Nordic power exchange market (Nord Pool) and is in addition a significant player on the financial power exchange market.

Water is a clean and renewable energy source. The environmental effects of hydro power development are small compared to those of other types of energy.

Technical data for the power plants

| Power plants | Operational year | Installation MW | Head m | Average output GWh/år |
|------------------------------|------------------|-----------------|--------|-----------------------|
| 01 Nedre Leirfoss | 1910 | 12 | 27 | 65 |
| 02 Øvre Leirfoss | 1901 | 15 | 34 | 85 |
| 03 Bratsberg | 1977 | 124 | 147 | 650 |
| 04 Fjæremfossen | 1957 | 18 | 27 | 74 |
| 05 Svean | 1939 | 30 | 55 | 106 |
| 06 Løkaunet | 1926 | 9 | 51 | 30 |
| 07 Heggsetfoss | 1962 | 34 | 71 | 19 |
| 08 Nedre Nea | 1989 | 66 | 96 | 381 |
| 09 Gresslifoss | 1966 | 20 | 34 | 108 |
| 10 Nea | 1960 | 175 | 377 | 675 |
| 11 Fossan | 2000 | 3 | 28 | 13 |
| 12 Tya | 1964 | 42 | 203 | 188 |
| 13 Vessingfoss | 1971 | 40 | 55 | 88 |
| 14 Nedalsfoss | 1974 | 26 | 98 | 68 |
| SUM NEA/NIDELVA | | 614 | | 2550 |
| 15 Svorkmo | 1983 | 26 | 99 | 131 |
| 16 Grana | 1982 | 36 | 462 | 136 |
| 17 Brattset | 1982 | 39 | 273 | 194 |
| 18 Litjfosse | 1982 | 36 | 289 | 78 |
| 19 Ulset | 1985 | 17 | 325 | 69 |
| SUM KVO-SHARE (48,6%) | | 154 | | 608 |
| SUM TOTAL | | 768 | | 3158 |

A map of TEV's hydro power plants



District heating

District heating is an energy system where water is heated and transported to the customers through underground insulated steel pipes. The district heating system consists of production units (heating stations) and a distribution system (district heating network).

Trondheim Energy Company (TEV) has nine main heating stations with a total installation of 252 MW. The production of district heating is based on the use of the following energy sources:

Basic production (new renewable energy sources)

| | |
|--------------------|-------|
| Waste energy: | 30 MW |
| Waste heat: | 20 MW |
| Bio energy (2001): | 9 MW |
| Landfill gas: | 2 MW |
| Heat pump (2001): | 1 MW |

Peak production and effect back-up

| | |
|--------------------|-------|
| Electric boilers: | 85 MW |
| Oil boilers: | 50 MW |
| Natural gas (LNG): | 30 MW |
| Propane gas (LPG): | 25 MW |

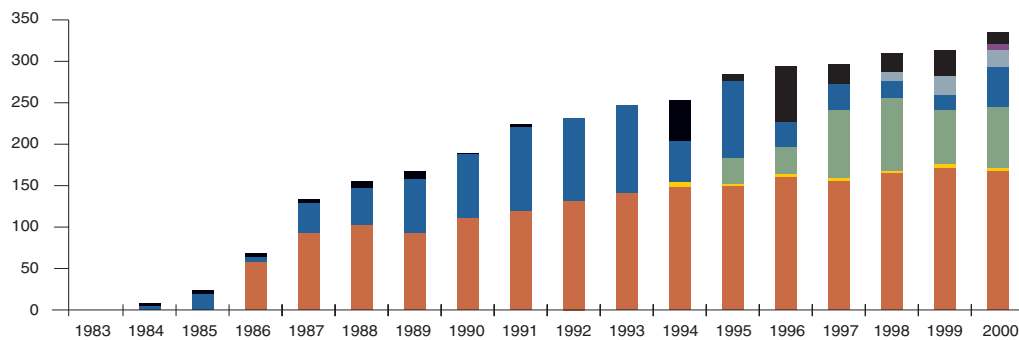
The main station, the Heimdal heating station, treats municipal waste from about 250,000 people in Trondheim and the neighbouring district. The station is in continuous operation.

The district heating network is today about 90 km long and is under constant expansion. During the year 2000, 337 GWh of heat was supplied to the network. About 50 % of the energy is based on energy recovery from waste combustion and 25 % on waste heat from the Lilleby Metall smelting plant. The district heating covers up to 25 % of the heating needs of Trondheim. The ambition is to increase the use of new renewable energy sources, and bio energy and a heat pump will be introduced in the district heating system during the year 2001.

The development of district heating has a positive effect on the environment, because it replaces oil fired boilers.

The supply of district cooling in the area of Nedre Elvehavn was started in 2000. The production of district cooling is based on cooling from the river Nidelva and the use of a cooling unit of 1.5 MW (absorption cooling engine), driven by the district heating.

GWh/year



Heimdal heating station



Transmission and distribution

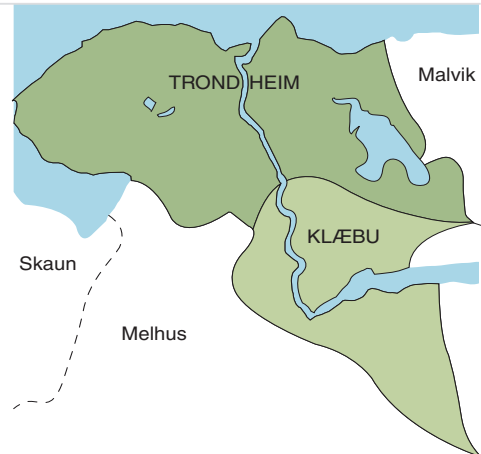


Cable installers working on the grid

Trondheim Energy Company transmits and distributes electric power to Trondheim and Klæbu. The area of concession consists of 495 square kilometres with 155 000 inhabitants. In a normal year 2500 GWh are transmitted through the grid, with a peak load of 580 MW. This is about 3.5 % of the general consumption of electric power in Norway.

The power is transmitted at 66 kV voltage through the sub-transmission system to 18 sub-stations, where it is transformed to 12 or 24 kV, and then distributed through the medium voltage distribution system to 1700 distribution stations. In these stations the energy is transformed to low voltage (230 or 400 V), and distributed through the low voltage system to about 85 000 grid customers.

The sub-transmission system is monitored and remote controlled around-the-clock from our operation centre. When a fault occurs on a line or cable, it is automatically disconnected and another takes over the supply. The system consists of lines and cables which form a meshed network between the sub-stations, in such a way that these are supplied from at least two sides. The medium and low voltage distribution system is not remote controlled, but has a fault indicator in the medium voltage system. When a fault occurs, our operation crew must then locate the fault, before they can restore the supply by reconnection or repair.



TEV's area of concession

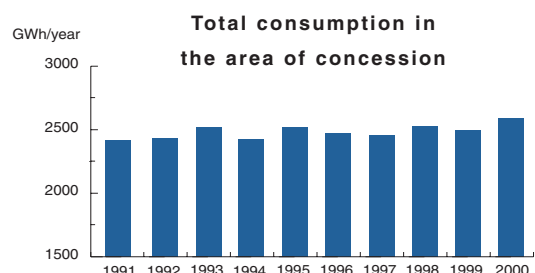
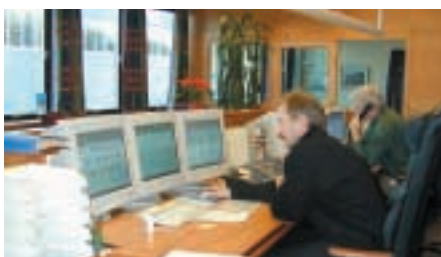
In central areas, where about 95 % of our customers are located, the grid mainly consists of cables. In rural areas it mainly consists of overhead lines. In addition to the ordinary distribution system, we also construct and operate the street light network for the municipality of Trondheim.

The supply reliability fluctuates from year to year, depending on weather conditions and other external factors. Moreover, the reliability varies from area to area. The 95 % of the customers who are located in central areas, experience on average one interruption every second year with a duration of one hour and 70 minutes. Customers in rural areas experience on average three interruptions per year with a total duration of 4.5 hours.

The transmission and distribution system

| TYPE | 230 V / 400 V Low voltage distribution system | 12 kV / 24 kV Medium voltage distribution system | 66 kV Sub-transmission system |
|--------------------------------|---|--|-------------------------------------|
| Overhead lines(km) | 300 | 183 | 70 |
| Cables (km) | 4000 | 890 | 65 |
| Distribution stations (number) | | 1700 | 18 |
| Transformers (number) | | 1850 | 44 |
| Transformer capacity (MVA) | | 949 | 870 |

TEV's operation centre for the sub-transmission system



Sale of power on the consumer market

TEV Kraftsalg is the subsidiary company of TEV that sells electric power to businesses and households.

Currently, TEV Kraftsalg, with 80 000 customers mainly in Trondheim and Klæbu and a turnover of about 2000 GWh, has a market share of 92 % within TEV's concession area. Over the last couple of years, few other energy companies have achieved such a high level of customer loyalty as TEV. This is a result of a marketing strategy where we distance ourselves from a price focus and rather underline the importance of economical energy consumption and lowest possible electricity bills.

minimal financial flexibility. Tempting offers normally do not result in customer satisfaction. Therefore, TEV Kraftsalg offers products that give customers more added value, such as consultation with regard to energy saving, electrical safety, energy contracts - and in addition to this, favourable energy prices in the long term. Research shows that sensible use of energy is more economical than changing to a different supplier.

TEV Kraftsalg has partners that can offer such consultation both to household- and business customers. For selected business segments, we can offer products that help our customers to gain



For an average household, of the total energy cost 36 % goes to public taxes and 32 % to the grid fee; the remaining 32 % is influenced by climatic changes and market forces, but also by us. Our trade department continually surveys the weather forecasts and the energy exchange market, and purchases when the market price is at its lowest. Normally this happens during mild, rainy periods when the reservoirs are full and, of course, in periods of low energy consumption.

An analysis of the conditions that influence prices demands professional expertise in the wholesale market and the financial energy market. The energy industry is extremely competitive and therefore there are high requirements regarding risk control, internal processes and not least customer service in order to be a serious supplier of energy.

Competition between suppliers in the energy industry is characterised by tempting price offers. In an industry where the profit margin is no more than 2 %, the energy suppliers have

optimal energy costs by economical use of kilowatt-hours. We also have several fixed price products created for each customer depending on their size, need and risk profile.

TEV Kraftsalg with its efficient employees and partners works with energy and energy related products and services. Our focus is to create better value for our customers, employees and owners. We will manage to do so by offering the best products and services available that customers are looking for. So we will have satisfied customers, which is the essential basis for giving our employees an attractive workplace and our owners good results. The aim of TEV Kraftsalg is to lead the way in Central Norway and other selected parts of Scandinavia.

**Our vision can be
expressed in three words:**

Your energy partner.

**The lake
Sylsjøen**



Power units:

| | | |
|-----|---|--------------------------------|
| V | - | volt (voltage) |
| kV | - | kilovolt (1000 volts) |
| A | - | ampere (current) |
| W | - | watt (effect) |
| kW | - | kilowatt (1000 watts) |
| kWh | - | kilowatt hour (energy) |
| MW | - | megawatt (1000 kW) |
| MWh | - | megawatt hour (1000 kWh) |
| GW | - | gigawatt (1 000 000 kW) |
| GWh | - | gigawatt hour (1 million kWh) |
| TW | - | terrawatt (1 000 000 000 kW) |
| TWh | - | terrawatt hour (1 billion kWh) |